Arliyani, I, 2019. Pemanfaatan Limbah Serbuk Gergaji Kayu Mahoni (*Swietenia macrophylla* King) sebagai Adsorben untuk Menurunkan Kadar Pb(II) dan Aplikasinya pada Limbah Cair Industri Pelapisan Logam. Skripsi ini di bawah bimbingan Dr. Eko Prasetyo Kuncoro, S. T., DEA. dan Drs. Handoko Darmokoesoemo, DEA. Program Studi S-1 Teknik Lingkungan, Departemen Biologi, Fakultas Sains dan Teknologi, Universitas Airlangga.

ABSTRAK

Penelitian ini bertujuan untuk mengetahui beda efisiensi adsorpsi Pb(II) dengan limbah serbuk gergaji kayu mahoni berdasarkan variasi pH dan waktu kontak. Model adsorpsi Pb(II) pada adsorben serbuk gergaji kayu mahoni didapatkan melalui model kinetika adsorpsi. Karakteristik adsorben serbuk gergaji kayu mahoni sebelum dan setelah mengalami kontak dengan Pb(II) dapat diketahui dengan uji FTIR. Penelitian ini dilakukan dalam skala laboratorium dan teknik adsorpsi yang digunakan adalah teknik *batch.* Variasi pH yang digunakan pada penelitian ini adalah pH 2, 3, 4, 5, dan 6. Variasi waktu kontak pada penelitian ini adalah 5, 10, 15, 30, 60, 90, 120, dan 150 menit. Data yang didapatkan dianalisis dengan analisis deskriptif dan analisis statistik dengan uji *Anova One-Way* dilanjutkan uji Duncan pada $\alpha = 0{,}05$. pH optimum pada pH 6 dengan efisiensi adsorpsi sebesar 72,82%. Waktu kontak optimum pada 30 menit dengan efisiensi adsorpsi sebesar 84,84%. Aplikasi pada limbah cair industri pelapisan logam dengan waktu kontak dan pH optimum memiliki efisiensi adsorpsi sebesar 72,53%. Model kinetika pada adsorpsi timbal (Pb(II)) menggunakan serbuk gergaji kayu mahoni mengikuti kinetika reaksi orde dua semu. Karakteristik serbuk gergaji kayu mahoni berdasarkan analisis FTIR terdapat gugus hidroksil (–OH), gugus karbonil (C=O), gugus cincin aromatik (C=C), dan lignin.

Kata kunci: adsorben, adsorpsi, *batch*, limbah cair industri, serbuk gergaji kayu mahoni, timbal.

Arliyani, I., 2019. The Utilization Waste of Wood Sawdust Mahogany Waste (Swietenia macrophylla King) as Adsorbent to Decrease Plumbum (Pb(II)) and Application in Waste Water of Electroplating Industry. This work was supervised by Dr. Eko Prasetyo Kuncoro, S. T., DEA. and Drs. Handoko Darmokoesoemo, DEA. Undergraduate Program Study of Environmental Engineering, Department of Biology, Faculty of Sciences and Technology, Universitas Airlangga.

ABSTRACT

The objectives of research are to find the difference of Pb(II) adsorption efficiency with mahogany sawdust waste based on variation of pH and contact time. Pb(II) adsorption model on wood sawdust mahogany was investigated based on adsorption kinetics model. Characteristic of wood sawdust mahogany as adsorbent before and after contact with Pb(II) was tested by FTIR. This research was conducted in laboratory scale and the adsorption technique used was batch technique. The pH variations used in this study were 2, 3, 4, 5, and 6. The contact time variations used were 5, 10, 15, 30, 60, 90,120, and 150 minutes. Data analysis were descriptive analysis and Anova One-Way test followed by Duncan test at α = 0,05. Optimum pH was pH 6 with adsorption efficiency of 72,82%. *Optimum contact time was at 30 minutes with adsorption efficiency of* 84,84%. *Applications in the waste water of electroplating industry with optimum pH and optimum contact time have adsorption efficiency of* 72,53%. *The kinetic model of plumbum adsorption (Pb(II)) using sawdust of mahogany wood was following the pseudo second order kinetics model. Based on FTIR analysis, it was found hydroxyl group (-OH), carbonyl group (C=O), aromatic ring group (C=C), and lignin.*

Keywords*: adsorbent, adsorption, batch, plumbum, sawdust mahogany wood, waste water industry.*